REMARKS

In the Office Action, the Examiner noted that claims 1-17 are pending in the application and the Examiner rejected claims 6-17. Claims 1-5 were withdrawn from consideration. By this Amendment, various claims have been amended. Thus, claims 1-17 remain pending in the application. The Examiner's rejections are traversed below.

REJECTION OF CLAIMS 6, 8, 12-15 AND 17

In item 2 on pages 2-7 of the Office Action, the Examiner rejected claims 6, 8, 12-15 and 17 under 35 U.S.C. § 103 as unpatentable over U.S. Patent 6,519,507 to Noguchi et al. in view of International Publication WO90/06836 to Karakama et al.

THE PRIOR ART

U.S. Patent 6,519,507 to Noguchi et al. is directed to a method of teaching a robot with a traveling axis off-line, by which the movement quantity of the traveling axis of the robot with a traveling axis can be monistically determined (col. 1, lines 56-59). Figure 1 is a display screen of an off-line teaching apparatus and illustrates a traveling track 1, a robot 2, a coordinate origin 3, a control point 5 of the robot, a workpiece 6 and a movement target point 7 on the workpiece 6. The robot 2 can travel freely on the traveling track 1 within a range of a traveling stroke 4 (col. 2, line 58 to col. 3, line 9). Function selector buttons 8 are used to select various types of functions with respect to off-line teaching. 8a is a button for selecting emphasis on position, 8b is a button for selecting emphasis on position and posture, 8c is a button for selecting emphasis on movement of the traveling axis, 8d is a button for selecting moving to the minimum distance, 8e is a button for selecting differential movement and 8f is a button for selecting moving to an arbitrary position. 9 denotes movement and teaching buttons, wherein 9a is a button for selecting movement and 9b is a button for selecting teaching (col. 3, lines 10-20).

When the button 9a is pressed after selecting the button 8d, the robot 2 travels on the traveling track 1 until the distance between the coordinate origin 3 and the movement target point is minimized. Thus, the robot 2 travels until the robot 2 directly faces the movement target point 7, as illustrated in Fig. 2 (col. 4, lines 1-6). As the movement target of the robot 2 on the traveling track 1 (i.e., the final position) is determined and displayed on the display, the operator judges whether or not there is anything inconvenient with respect to the position. If there is

nothing inconvenient, the button 9b is pressed, and the above-described movement target is determined as the teaching position. In addition, the operator presses the button 12a and causes the control point 5 to move toward the movement target point 7 (col. 4, lines 29-37).

In the Office Action, the Examiner acknowledges that Noguchi does not show a teaching position correction instructing means for commanding to correct a teaching position. However, the Examiner cites Karakama as showing a robot system that uses a commonly well known method in the art of using a teaching position correction instructing means for commanding to correct a teaching position.

THE CLAIMS PATENTABLY DISTINGUISH OVER THE PRIOR ART

Claim 6

Claim 6 is directed to a teaching position correcting apparatus for correcting a teaching point position of a robot operation program. Work tool moving/stopping means allows a work tool mounted on an arm tip end of the robot to move toward a teaching point of the robot operation program, and automatically stops the work tool before it reaches the teaching point. Jog feed means move the robot by jog feeding from the position where the work tool is stopped by the work tool moving/stopping means. Positional relation presenting means presents, to an operator, a positional relation between the work tool and an operation target. Teaching position correction instruction means command to correct a teaching position.

The subject application describes that when a robot is relocated to another factory or another place in the same factory, or when the off-line prepared operation program is applied to an actual robot, it becomes necessary to correct the teaching position of the program. Further, it is difficult to make the relative positional relation between the robot and the fixing jig exactly the same before and after the relocation. It is also difficult to make the actual robot and the operation target the same as the relative positional relation between various elements of a model when the operation program is prepared off-line. Thus, an error of from several millimeters to several tens of millimeters is caused due to an error of measurement or disposition, making it necessary to correct the teaching position of the program after the relocation, or when the operation program prepared off-line is applied (page 8, line 16 to page 9, line 7 of the specification). In conventional correcting methods, the robot is stopped before the teaching position during a step feeding action so that the robot or a work tool of the robot does not come into contact with the operation target. Then, the teaching position is corrected

manually one-point-by-one-point, which is a labor intensive operation. If the input of the robot stop command is delayed, the work tool may collide against the operation target, thereby damaging the work tool or the operation target. Alternatively, if the robot is stopped too early, the manual feeding time by jog action becomes long and the operation efficiency deteriorates (page 2, lines 10-21 of the specification).

The Examiner relies upon col. 4, lines 1-6 of Noguchi as describing moving toward a teaching point of a robot operation program and stopping the work tool before it reaches the teaching point. However, col. 4, lines 1-6 of Noguchi describe how to determine a position of a robot on a traveling track 1. Further, Noguchi only discusses an off-line teaching system in which a robot program is created by simulation on a computer. It does not discuss the reproduction of a robot program.

On page 2 of the Office Action, the Examiner also takes the position that col. 4, lines 36-37 of Noguchi disclose the claimed jog feed means of claim 6. However, col. 4, lines 36-37 of Noguchi only explain that a robot (on a computer) moves toward the movement target position 7 from a position on the traveling track when the button is pressed by an operator. It does not discuss jog feeding of a robot.

On page 2 of the Office Action, the Examiner also takes the position that col. 4, lines 33-34 disclose the claimed position or relation presenting means. However, Noguchi only discusses graphic display of a robot position simulated on an off-line teaching system, on a display screen on a computer. Thus, Noguchi displays the result of simulation, not the positional relation between an actual robot tool and work.

On page 3 of the Office Action, the Examiner takes the position that Karakama shows a robot system that uses a commonly well-known method in the art of using a teaching position correction instructing means for commanding to correct a teaching position. In Karakama, the point to be corrected by manual teaching has to be provided with an instruction code "S89" in a robot program and the teaching point for which positional correction is carried out by applying the amount of correction at the teaching point concerned, has to be provided with an instruction code for positional correction, "G45" in the robot program. Thus, the technique of Karakama is applicable only to a case where the cause of an error (positional error of a workpiece to be supplied in the example of Karakama) is known beforehand and the teaching point to be corrected is specified beforehand from among a plurality of teaching points in a program. In contrast, the present claimed invention is not restricted to the above cases but is applicable even

if a teaching point at which teaching is to be corrected is not known beforehand or a point at which positional correction is to be carried out is not known beforehand.

Thus, the invention of claim 1 is applicable to cases where when a relative position between a robot and an operation target or attitudes thereof are changed because position of the robot or operation target is changed, a teaching position of an already prepared robot operation program must be corrected in some cases. When an operation program is prepared by an off-line program, it is necessary to correct the teaching point position of the robot operation program prepared off-line in accordance with actual position of the operation target at a worksite due to an error between positions of the robot and the operation target prepared off-line, and actual positions of the robot and the operation target. This is described at page 9, lines 9-19 of the subject application.

It is submitted that the prior art relied upon by the Examiner does not recognize the above-described deficiencies of the prior art and further does not teach or suggest the claimed teaching position correcting apparatus of claim 6 which includes:

> work tool moving/stopping means for allowing a work tool mounted on an arm tip end of said robot to move toward a teaching point of said robot operation program, and to automatically stop said work tool before it reaches the teaching point;
>
> jog feed means for moving said robot by jog feeding from a position where said work tool is stopped by said work tool moving/stopping means;
>
> positional relation presenting means for presenting, to an operator, a positional relation between said work tool and an operation target; and
>
> teaching position correction instructing means for commanding to correct a teaching position.

Therefore, it is submitted that claim 6 patentably distinguishes over the prior art.

Claim 15

Claim 15 is directed to a teaching position correcting apparatus which includes:

> work tool moving/stopping means for allowing a work tool mounted on an arm tip end of said robot to move toward a

teaching point of said robot operation program, and to automatically stop said work tool before it reaches the teaching point;

jog feed means for moving said robot by jog feeding from a position where said work tool is stopped by said work tool moving/stopping means;

teaching position correction instructing means for commanding to correct a teaching position; and

teaching point position correcting means for automatically correcting a next and subsequent teaching point positions based on a position correcting amount of one or more teaching points whose teaching position was corrected.

Therefore, it is submitted that claim 15 patentably distinguishes over the cited art.

Claim 17

Claim 17 is directed to a teaching position correcting apparatus which includes:

work tool moving/stopping means for allowing a work tool mounted on an arm tip end of said robot to move toward a teaching point of said robot operation program and to automatically stop said work tool when the distance between said work tool and said teaching point becomes shorter than a predetermined distance;

jog feed means for moving said robot by jog feeding from a position where said work tool is stopped by said work tool moving/stopping means; and

teaching position correction instructing means for commanding to correct a teaching position.

On page 7 of the Office Action, the Examiner states that with respect to claim 17, Noguchi shows stopping the work tool when the distance between the work tool and the teaching point becomes shorter than a predetermined distance, relying on col. 4, lines 14-17 of Noguchi. However, this portion of Noguchi provides some examples of how to determine the position of the robot on a traveling track but does not discuss the features of claim 17. Therefore, it is submitted that claim 17 patentably distinguishes over the prior art.

Claims 8 and 12-14

Claims 8 and 12-14 depend from claim 6 and include all of the features of that claim, plus additional features which are not taught or suggested by the prior art. Therefore, it is submitted that claims 8 and 12-14 patentably distinguish over the prior art.

THE REMAINING REJECTIONS

In items 3-6 on pages 8-12 of the Office Action, the Examiner issued various rejections of claims 7, 9-11 and 16 as obvious over various combinations of Noguchi and Karakama, taken in combination with one or more of U.S. Patent 6,763,284 to Watanabe et al., U.S. Patent 4,626,013 to Barrows, U.S. Patent 6,014,909 to Flora and U.S. Patent 5,980,082 to Watanabe. Claims 7, 9-11 and 16 depend from claim 6 or claim 15 and include all the features of the claims from which they depend, plus additional features which are not taught or suggested by the prior art. Further, the additional cited prior art does not cure the deficiencies of Noguchi and Karakama, as explained above. Therefore, it is submitted that claims 7, 9-11 and 16 patentably distinguish over the prior art.

SUMMARY

It is submitted that none of the references, either taken alone or in combination, teach the present claimed invention. Thus, claims 6-17 are deemed to be in a condition suitable for allowance. Reconsideration of the claims and an early notice of allowance are earnestly solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: December 3, 2007

By: _____
John C. Garvey
Registration No. 28,607

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501